The Claims

What is claimed is:

1. An optical chromatic dispersion compensator adapted for bettering performance of an optical communication system comprising:

a collimating means for receiving a spatially diverging beam of light which contains a plurality of frequencies as may be emitted from an end of an optical fiber included in an optical communication system, the collimating means also converting the received spatially diverging beam of light into a mainly collimated beam of light that is emitted from the collimating means;

an optical phaser which provides an entrance window for receiving the mainly collimated beam of light from the collimating means and for angularly dispersing the received beam of light in a banded pattern that is emitted from the optical phaser, whereby the received beam of light becomes separated into bands so that light having a particular frequency within a specific band is angularly displaced from light at other frequencies within that same band; and

a light-returning means which receives the angularly dispersed light having the banded pattern that is

emitted from the optical phaser, and for reflecting that light back through the optical phaser to exit the optical phaser near the entrance window thereof.

2. The compensator of claim 1 wherein the mainly collimated beam of light emitted from the collimating means has a divergence which ensures that more than fifty-percent (50%) of energy in the mainly collimated beam of light impinging upon the entrance window diffracts into fewer than three (3) diffraction orders for any beam of light at a particular wavelength in the angularly dispersed light emitted from the optical phaser in the banded pattern.

3. The compensator of claim 1 wherein light enters the optical phaser through the entrance window at near normal incidence.

4. The compensator of claim 1 wherein the entrance window of the optical phaser is at least partially transparent to light impinging thereon.

5. The compensator of claim 1 wherein the light-returning means includes a light-focusing means and a mirror disposed near a focal plane of the light-focusing means, the light-focusing

means collecting the angularly dispersed light having the banded pattern emitted from the optical phaser for projection onto the mirror, the mirror reflecting light impinging thereon back towards the light-focusing means.

6. The compensator of claim 5 wherein the light-focusing means projects to a distinct location on the mirror each band in the banded pattern of angularly dispersed light generated by the optical phaser.

7. The compensator of claim 5 wherein a distance between the light-focusing means and the optical phaser is adjustable.

8. The compensator of claim 5 wherein the mirror is curved.

9. The compensator of claim 8 wherein curvature of the mirror is adjustable.

10. The compensator of claim 9 wherein curvature of the mirror is adjusted by bending the mirror.

11. The compensator of claim 10 wherein force for bending the mirror is selected from a group consisting of mechanical, electrical, magnetic and thermal.

12. The compensator of claim 9 wherein the mirror has multiple curvatures, and curvature of the mirror is adjusted by translating the mirror.

13. The compensator of claim 9 wherein the mirror is replaceable, and curvature of the mirror is adjusted by replacing the mirror with another mirror having a different curvature.

14. The compensator of claim 1 wherein the optical phaser is made from a plate of material having two parallel surfaces between which light after entering the optical phaser through the entrance window reflects, and with the entrance window being formed on an outer surface of the plate.

15. The compensator of claim 14 wherein the entrance window is formed by a beveled edge of the plate.

16. The compensator of claim 14 wherein the entrance window is formed by a prism which projects out of one of the two parallel surface of the optical phaser, and light entering the

optical phaser through the entrance window undergoes internal reflection within the prism before impinging upon one of the two parallel surface.

17. The compensator of claim 14 wherein one of the two parallel surface of the optical phaser is partially transparent to allow a portion of light impinging thereon to exit the optical phaser.

18. The compensator of claim 17 wherein light emitted from the optical phaser through the partially transparent surface defracts at an angle which exceeds forty-five degrees (45°) from a normal thereto.

19. The compensator of claim 1 wherein the optical phaser is made from a material having an index of refraction which is greater than the index of refraction of medium surrounding the optical phaser.